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Electrocatalytic oxidation of $K_4[Fe(CN)_6]$ by metal-reducing bacterium *Shewanella oneidensis* MR-1

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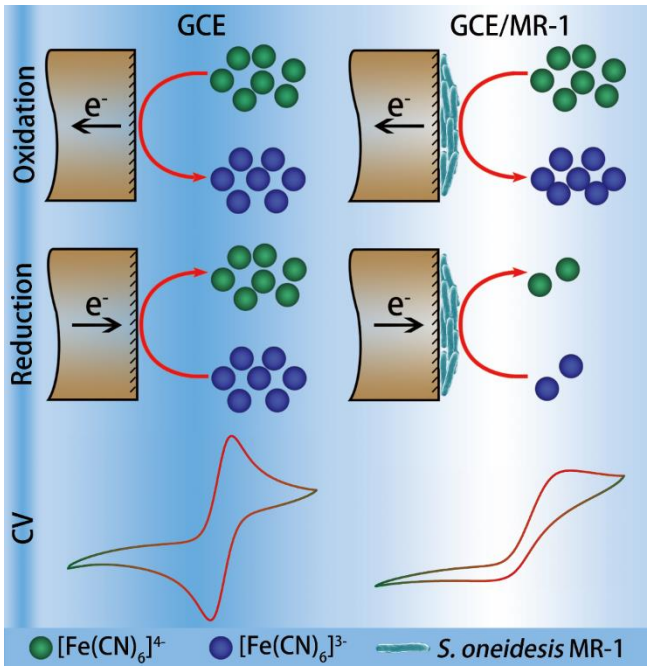
The microbial metabolic activities between metals and bacteria play a vital role on biogeochemical cycling of metal compounds[1]. One of these activities is extracellular electron transfer (EET), in which some microbes exchange electrons with external redox minerals, electrodes, or even other microorganisms[2-4]. The bacteria can either take electrons or give electrons. *Shewanella oneidensis* MR-1 (MR-1) is electrochemical active, it can transfer electrons from cell to extracellular electron acceptors including Fe(III) (hydro)oxides. In this study, we report that MR-1 electrocatalyze the oxidation of an inorganic redox compound $K_4[Fe(CN)_6]$. A pair of symmetric peak in the cyclic voltammetry (CV) of $K_4[Fe(CN)_6]$ were found on bare glassy carbon electrode (GCE) (**Scheme 1**). Surprisingly, when the GCE is coated MR-1, the anodic peak almost sustained at the same level; while the cathodic peak apparently shrunk (**Scheme 1**, right). We attribute this phenomenon to the electrocatalytic oxidation by MR-1. The discovery of the ability to oxidize $[Fe(CN)_6]^{4-}$ by MR-1 broadens our horizon of the role that dissimilatory metal reduction bacteria play in the environment.



Scheme 1 The conversion of $[Fe(CN)_6]^{4-/3-}$ on GCE (left) and electrocatalysis oxidation of $[Fe(CN)_6]^{4-}$ to $[Fe(CN)_6]^{3-}$ by GCE coated with MR-1 (right).

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